Journal of Taibah University Medical Sciences (2015) 10(1), 116–121

Taibah University

Journal of Taibah University Medical Sciences

www.sciencedirect.com

Educational Article

The Saudi Orthopedic Residency Program: A comparison of the Riyadh training center with other Saudi training centers

Abdulaziz Al-Ahaideb, FRCSC, Hamza M. Alrabai, SB-Orth *, Osama A. Alrehaili, MD, Hazem M. Al-Khawashki, FRCSEd, Waleed Awwad, FRCSC and Abdulrahman D. Algarni, ABOS

College of Medicine, King Saud University, King Khalid University Hospital, Riyadh, Kingdom of Saudi Arabia

Received 25 March 2014; revised 4 June 2014; accepted 7 June 2014; Available online 23 December 2014

الملخص

أهداف البحث: تقييم مستوى التدريب ببرنامج الاختصاص السعودي لجراحة العظام بشكل عام وعمل مقارنة بين مركز تدريب الرياض والمراكز الأخرى في المملكة العربية السعودية.

طرق البحث: شارك في الدراسة ٣٨ طبيباً مقيماً من مركز الرياض و ٣٢ طبيباً من مراكز التدريب الأخرى، حيث قاموا بتعبئة استبانات عن أهم الجوانب الأساسية المتعلقة بالتدريب.

النتائج: كان الإقبال على قراءة المجلات العلمية المتخصصة أكثر لدى متدربي الرياض، مقارنة بزملائهم خارج الرياض، الذين تزايد إقبالهم على قراءة الكتب العلمية (P=٠.٠٢٨). وقد أظهر الاستطلاع وجود عدم كفاية التدريب في مجال الإصابات والحوادث بالنسبة للأطباء المقيمين بمركز الرياض، وكذلك عدم كفاية نسبية في التخصصات الدقيقة الأخرى لدى المتدربين بالمراكز خارج الرياض. وكان انطباع معظم الأطباء المتدربين خارج الرياض عن التدريب بأنه دون المستوى المطلوب، الأمر الذي نفاه نظراؤهم في مركز الرياض (P=٠.٠٢١). وكان رأي الأغلبية بأن درجة الامتحان لا تعكس بالضرورة المستوى الحقيقي للمتدرب، وأن أعداد المتدربين المتزايدة باتت تفوق الطاقة التدريبية للبرنامج، وبشكل عام لم تظهر نتائج الدراسة وجود فرق يذكر بين المتدربين من ناحية امتلاك المهارة الكافية للقيام بالجراحات العظمية الأساسية بعد إتمام التدريب.

الاستنتاجات: المادة العلمية يجب أن تكون في متناول جميع الأطباء المقيمين، وكذلك يفضل تعيين مشرفين لمتابعة تقدم المتدربين. يجب منع أعضاء الفريق الطبي من التعدي على حقوق المتدرب أو تضييع فرص التدريب عليه. يجب ألا تتجاوز أعداد المتدربين استيعاب القدرة التدريبية للبرنامج. آراء المتدربين يجب أن تحترم، وكذلك يلزم اللجنة العلمية بالبرنامج معرفة المدربين المقصرين ومحاسبتهم. كما يجب تحديد التخصصات الدقيقة التي لا يتلقى المتدرب فيها المستوى المطلوب والعمل على سد الحاجة فيها. ويمكن أن يستخدم كتيب تسجيل الحالات الجراحية كمقياس لاكتفاء المتدرب في تخصصات معينة، وعلى لجنة الامتحانات بالبرنامج تجنب التغييرات المفاجئة والمتكررة في أساليب ومواعيد وأماكن الامتحانات.

الكلمات المفتاحية: تقييم؛ تعليم طبي؛ برنامج تدريب؛ برنامج الاختصاص السعودي لجراحة العظام؛ التدريب

Abstract

Objective: To evaluate the training quality of the Saudi Orthopedic Residency Program in general, and to compare the Riyadh training center with other training centers in Saudi Arabia.

Methods: A group of 38 residents from Riyadh and 32 residents from other centers in Saudi Arabia were surveyed in a cross-sectional manner. The participants completed carefully designed questionnaires pertaining to the most critical issues of their training.

Results: Reading peer-reviewed, scholarly articles was more popular with trainees in Riyadh compared with trainees working outside Riyadh, for whom textbooks were the dominant educational resource ($P = 0.028$). The data revealed insufficiencies in surgical training in the trauma discipline in Riyadh and relative deficiencies of surgical experience in subspecialties outside of Riyadh. In contrast to residents trained outside of Riyadh, Riyadh trainees denied having a weak level of training

* Corresponding address: Orthopedic Senior Registrar, Department of Orthopedics (49), King Khalid University Hospital, King Saud University, P.O. Box 7805, Riyadh 11472, Kingdom of Saudi Arabia.

E-mail: hamzarabai@gmail.com (H.M. Alrabai)

Peer review under responsibility of Taibah University.

ELSEVIER Production and hosting by Elsevier

 http://dx.doi.org/10.1016/j.jtumed.2014.06.003

($P = 0.021$). Examination scores did not reflect the actual level of resident competency according to the residents' responses. The program's capacity could not accommodate the growing number of trainees. Both groups reported similar levels of expertise with regard to the basic orthopedic operative skills.

Conclusion: Educational resources should be within the reach of all residents. Senior supervisors should not compromise resident training. The number of trainees should be proportional to program capacity. Resident feedback should not be neglected, and the program committee must recognize delinquent trainers and protect the trainees from them. Deficient areas of training should be identified and rectified. A case logbook may be used as an indicator of surgical exposure. Frequent changes to examination formats, dates and locations should be avoided.

Keywords: Evaluation; Medical education; Residency program; Saudi Orthopedic Board; Training

Introduction

The Saudi Commission for Health Specialties (SCFHS) is the authorized administrative body that grants accreditation to the local training institutions and controls the qualification of healthcare workers in Saudi Arabia. In addition, SCFHS directly supervises the post-graduate local training in different medical fields. Orthopedic surgery training is the responsibility of the Saudi Orthopedic Residency Program, which is in turn ruled by SCFHS. Saudi Orthopedic Residency Program has branches in the major Saudi cities and the training is only performed in the accredited training institutes. Training of residents who belong to a particular program is typically based locally in their main center. The minimum duration of orthopedic training is five years and trainees are evaluated regularly during each rotation. The evaluation of the resident is the responsibility of the attending physician who records the level achieved by the trainee according to a specific scale given in the resident evaluation form. The resident evaluation form basically tests 4 main training domains; knowledge, clinical skills, operative skills and personality and ethics. Residents must pass a requisite examination at the end of each training year to be promoted to the next level of training. After completion of the fifth training year, the trainee becomes board eligible. Candidates who pass the theoretical and clinical sections of the final exam are certified by the Saudi Board of Orthopedic Surgery (SB-Orth).

However, deficiencies in healthcare systems may lead to serious consequences for the health of the population; therefore, there is little doubt as to why many governments devote considerable attention and effort to develop these systems. The aptitude of medical practitioners is an essential part of a healthcare system, which is directly related to the quality of training and the licensing process. Governmental awareness of the importance of medical education has resulted in significant changes in healthcare systems to optimize medical training. In 1996, the Royal College of Physicians and Surgeons of Canada adopted the guidelines of the Canadian Medical Education Directions for Specialists (CanMEDS).[1] Similarly, the regulations of the Accreditation Council for Graduate Medical Education (ACGME) were implemented in the United States in 1999,[2–4] and the Australian government formulated the Australian Curriculum Framework for Junior Doctors in 2006.[5,6]

The recent expansion of the Saudi Orthopedic Residency Program in terms of the number of trainees and training institutions has had a remarkable effect on the quality of training. The aim of the present study was to investigate the current status of training of the Saudi Orthopedic Residency Program from the residents' perspective and to compare feedback from Riyadh residents regarding training quality with the impression of their peers outside of Riyadh.

Methods

A proposal for the present study was reviewed and approved by the institutional review board. A cross-sectional study was conducted from 2011 to 2012 among residents enrolled in the Saudi Orthopedic Residency Program. Invitations to participate in the study were sent by email to 90 residents who represented almost all the senior in-training orthopedic residents in Saudi Arabia. 40 residents were from Riyadh center whereas the remaining 50 were trained outside of Riyadh. Seventy residents completed the questionnaire and returned them back to the research team with about 78% overall response rate. Thirty-eight residents out of the 40 Riyadh residents and 32 residents out of the 50 whose training was based outside of Riyadh completed the survey questionnaires. The response rates were around 95% and 64% in Riyadh and outside of Riyadh, respectively.

Junior residents in their first and second years of training were excluded because of their limited orthopedic experience. The questionnaire consisted of 27 items arranged in six sections. The questions were closed-ended with multiple-choice answers. The questionnaire was carefully formulated by a group of experts to examine the most critical aspects of the training process and included demographic data, academic educational activities, operative skills training, teaching staff aptitude, exams and trainee's overall self-satisfaction.

Statistical analysis was performed using SPSS version 19 (IBM Corporation, USA). The questionnaire's reliability was verified through test-retest study. P values were obtained using χ^2 and Fisher's exact tests; $P < 0.05$ was considered to be statistically significant.

Results

Participants in each group were distributed evenly based on their level of training. Although textbooks represented the

primary educational resource for the Saudi-trained residents, Riyadh residents relied less on textbooks compared with their counterparts outside of Riyadh ($P = 0.028$). On the other hand, peer-reviewed scholarly articles were used more frequently among Riyadh residents. Some residents from both groups significantly benefited from scientific discussion in building their specialty knowledge. Trauma rounds were reported to be a regular daily activity by almost 40% of Riyadh residents and approximately 70% of residents outside of Riyadh ($P = 0.015$). Some residents reported a weekly frequency of trauma rounds, while less than a tenth of the trainees claimed that they never participated in such an activity. However, around 60% of participants from both groups rated the content of trauma rounds as good to excellent. Based on more than 40% of the residents' views, assigning a specific faculty member to conduct each session was believed to be the most effective way to increase the educational value of trauma rounds. Some trainees preferred to concentrate on certain trauma subjects during these rounds. More than 80% of the residents in all centers did not believe that increasing the number of trauma rounds or the time allocated to them were advantageous options.

More than 60% of the participants stated that educational benefit was their main motive in attending the half-day activity. However, approximately one-quarter of Riyadh residents had no interest in the half-day activity other than signing the attendance form, whereas this response was indicated by only approximately 5% of residents outside of Riyadh ($P = 0.046$). Two-thirds of the participants attended the half-day activity on a regular basis. A small fraction (15%) of the residents either from Riyadh or from other programs described the educational half-day as 'useless'. The survey demonstrated concordance among the respondents with regard to the effective use of these half-days in the following order: educational material should be presented in a clinically oriented, problem-solving format rather than a conventional slide presentation; the presenter should be well versed in the subject and be more interactive with the audience; and the residents should be able to select the subjects and the tutors.

The survey did not reveal any significant difference among the Saudi training centers with regard to orthopedic residents' experience in the outpatient setting. The proportion of residents who discussed difficult cases with the responsible attending physician exceeded 50%. Also, >15% of the trainees discussed new clinical cases with the consultants. Unfortunately, approximately 3% of the residents were unable to discuss any clinical case because the attending physician was absent. The questionnaire responses revealed that approximately one-fourth of the residents were intermittently involved in the preoperative planning of surgical cases. However, one-third of the participants indicated that there were no preoperative rounds in their training institute. Fewer than one-quarter of the Riyadh residents were given advanced notice about the objectives of their next rotations, compared with approximately 5% of the residents outside of Riyadh ($P = 0.046$). Fifty percent or more of the participants described the predetermined objectives of the rotations as an 'unheard-of event'.

There was no significant difference in surgical skills training among the residents in almost all centers including Riyadh. The intraoperative duties of residents, such as assisting in surgery, performing operations with direct instructions, closing surgical wounds and occasionally performing some procedures at their competency level alone, showed some variability. Figures 1 and 2 illustrate the residents' subspecialty-based ratings of the best and the worst surgical exposures, respectively. Table 1 summarizes of the sufficiency of surgical training in selected common orthopedic surgeries as perceived by the residents.

The majority (>80%) of participants supported official censure of nonefficient trainers by the program committee. One-half of the current trainers were considered to be incompetent according to >50% of the respondents. Regarding the best way to encourage trainers to be more active in terms of resident teaching, 80% of the residents in Riyadh and 40% of the trainees outside of Riyadh recommended withholding residency service from nonefficient trainers ($P = 0.001$). In addition, one-third of the residents who did not belong to the Riyadh center and 5% of Riyadh participants believed that active teachers should be offered a financial incentive or reward ($P = 0.002$). Some residents from both groups advocated that highly proficient trainers be granted an academic title.

Almost all residents experienced exam-related anxiety regardless of the training center they belonged to. Ninety-five percent of the respondents agreed that exam scores did not necessarily reflect actual competency levels. According to >90% of the participants, exam preparation significantly jeopardized the time devoted to reading for specialty practice. The frequency of mock exams ranged from three to five times per year for each trainee, according to >80% of the surveyed orthopedic residents from all over Saudi Arabia. The survey showed that residents used similar reading materials during their exam preparation. Multiple-choice questions were the preferred study material for >70% of the examinees. In addition, 15% of the residents studied from textbooks to prepare for their exams, while peer-reviewed scholarly articles were the least popular study material.

The responses indicated that the training programs were overpopulated with trainees in all centers. Approximately 80% of the residents who trained outside of Riyadh frankly reported that their residency training was below expectations, which may be negatively reflected in their future orthopedic operative skills. In contrast, nearly 50% of Riyadh trainees disagreed with that statement ($P = 0.021$). Interestingly, the survey revealed no difference between the

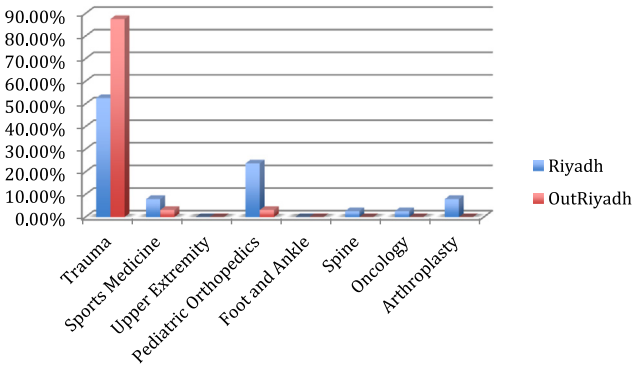

Figure 1: Best surgical exposure based on subspecialty.

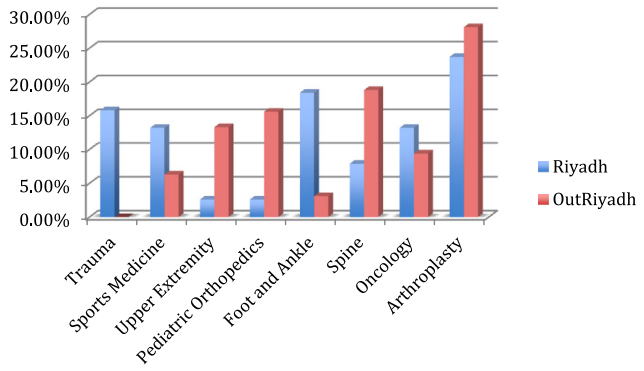

Figure 2: Worst surgical exposure based on subspecialty.

residents in both groups regarding their expected self-confidence to conduct standard orthopedic operations alone after completion of training.

Discussion

Textbooks have been a significant source of scientific study material for students for many years. Currently, however, scholarly articles have become a more popular educational resource particularly in North America.[4,7–9] Unlike textbooks, articles are usually more practical in terms of size, retrievability and sharing with colleagues. Aside from containing highly current knowledge, scholarly articles are an abundant exam resource. The popularity of scholarly articles was higher in Riyadh, which could be attributed to the limited access to high-value, specialized periodicals in training institutes outside of Riyadh. Although trauma cases in Riyadh are more frequent, Riyadh-trained residents tended to encounter fewer trauma cases compared with their peers in other areas because trauma patients are usually distributed to several trauma centers in the city compared with the situation outside of Riyadh where trauma cases are directed to only one or two hospitals.

Although the majority of residents believed that educational half-day activities were helpful to their training, some trainees, particularly in Riyadh, were only concerned with signing the attendance sheet. Troublesome transportation, uncooperative attending physicians and frequent, late apologies of the assigned tutors may be factors that caused some residents to lose their interest in attending the half-day activity. In addition, the interactive problem-solving style, rather than didactic presentation, was the preferred way of conducting the half-day activity according to most of the survey respondents, which is consistent with the results of related literature.[10] Most of the well-established training programs follow certain curricula defining the parameters of training.[11,12] Unfortunately, the curriculum of the Saudi Orthopedic Residency Program remains incomplete and immature. However, a minority of Riyadh residents were informed about the learning objectives before some rotations.

Following the reduction of resident work hours in the United States by the ACGME, the directors of training programs realized that the quality of training may decline and a long debate on how to overcome these obstacles ensued.[13] According to the present survey, on the other hand, approximately one-half of the Saudi residency training time is wasted by attending physicians acting non-professionally, without any disciplinary action from the organizing committee despite emphatic objection from residents. The negative effects of retaining delinquent trainers goes beyond waste of trainee time to the unfavorable potential influence of the 'hidden curriculum', which refers to the bad habits and behaviors of teachers that could be indirectly and gradually perceived by students to be acceptable.[4,12,14] On the other hand, the Saudi-trained residents hoped that the organizing committee would identify competent educators and reward them with either financial incentives or an honorary position.

Orthopedic clinical practice is an essential part of orthopedic training. A period of two half-days per week in the clinical setting under expert supervision was recognized to be the minimum time required by each resident in the context of patient care core competency according to the ACGME guidelines.[15] The outpatient clinic is where the resident can interact with patients and refine the required medical skills of history taking, physical examination, communication and clinical judgment. However, the trainee clinician must be under the guidance of the attending physician. Therefore, the organizing committee of the training program should identify the consultant clinicians who leave the trainee clinicians unattended or fail to teach residents in the clinical setting and report them to the higher authorities in SCFHS.

Because orthopedic surgical skills are acquired by hands-on practice, Robbins et al. advocated determining a

Table 1: A summary of the surgical training sufficiency in selected common orthopedic surgeries as perceived by the residents.

	Riyadh program		Other programs		*P*
	Adequate	Inadequate	Adequate	Inadequate	
Femur nailing	59.5	40.5	83.3	16.7	0.034
ORIF of ankle fractures	56.8	43.2	63.3	36.7	0.585
DDH open reduction	56.8	43.2	24.1	75.9	0.008
Knee arthroscopy and meniscectomy	35.1	64.9	26.7	73.3	0.457
Shoulder arthroscopy	21.6	78.4	3.3	96.7	0.030
Primary total knee replacement	47.2	52.8	34.5	65.5	0.300
Posterior spinal fusion and instrumentation	54.1	45.9	20.0	80.0	0.004
Hallux valgus correction	10.8	89.2	6.7	93.3	0.442

Data presented as % unless otherwise indicated. DDH, Developmental dysplasia of the hip; ORIF, Open reduction and internal fixation.

minimum requirement of surgical experience in basic orthopedic operations and defining a specific surgical role for residents in each type of orthopedic operation.[16] Although the roles of residents in the operating room were comparable in both groups, the present survey revealed a general trend characterized by more surgical experience in trauma-related procedures among the residents who belonged to training centers other than Riyadh, whereas Riyadh-trained residents reported more surgical exposure in the orthopedic subspecialties. These findings were expected because most Saudi tertiary centers, where advanced surgical procedures are performed, are located in Riyadh. Hence, the program committee should supplement the residents' surgical training deficiencies by rotating trainees among the training centers or cities. Such changes are mandatory and should be made ahead of time to allow the migrant residents to overcome issues such as housing or schooling for their children.

Exams and stress are a common occurrence. Almost all the Saudi trained-residents based on the survey experienced exam-induced anxiety. The Examination Committee of the Saudi Orthopedic Residency Program may be responsible for such an exaggerated feeling. The residents' concept of Saudi orthopedic exams was consistently unclear. The exam dates, formats and locations were subject to frequent changes. Mock exams were rarely conducted for the candidates. Consequently, studying for exams compromised study for orthopedic core knowledge; multiple-choice questions were the most studied material before exams. Interestingly, exam scores had no relation to the actual knowledge level of a given resident, which reflects a flawed examination system and questions its role as an evaluation tool of trainee competency levels. The participants indicated that the number of trainees grew dramatically to a level beyond the training capacity of the program. Increasing failure rates and annual acceptance of new students led to retention of residents enrolled in the program. Satisfaction rates were higher in the Riyadh trainees. Inadequate training in the orthopedic subspecialties may be the cause of lower satisfaction among residents who were trained outside of Riyadh. The level of self-confidence to perform general orthopedic procedures without supervision by the end of the residency period was comparable in both groups, which could be the result of similar orthopedic surgical theater experience. However, an operative case logbook should be utilized to effectively ensure mastery of standard orthopedic interventions for each trainee.[17]

The present study had some limitations. The residents' study resources were discussed generally but online learning was not examined in depth. In addition, the effect of long work and on-call hours, which may compromise the quality of training, were not explored. Other factors that may potentiate resident education, such as research, conferences and workshops, were not investigated in the present study. Nevertheless, the present study highlighted various significant elements of the Saudi Orthopedic Residency Program.

Conclusion

All orthopedic residency programs aim to produce highly professional, safe orthopedic surgeons. For these reason, guidelines are formulated to enhance training quality. The Saudi Orthopedic Residency Program steps toward leadership in the Middle East; however, some training-related aspects need positive revision as soon as possible to promote training quality and minimize unfavorable consequences. Therefore, we suggest some points to be considered in the Saudi Orthopedic Program curriculum:

1. A user-friendly, free electronic portal to high-value orthopedic references and journals should be available to all trainees.
2. Fellows and attending physicians should not compromise resident training. The role of each member should be defined and protected.
3. The organizing committee should listen to residents' feedback about their training and interact with them.
4. The system should recognize inefficient, unprofessional trainers and manage them.
5. A minimum surgical training target for residents should be determined and the use of surgical logbooks as a measuring tool should be emphasized.
6. The number of the trainees should not exceed the program's training capacity.
7. The organizing committee should determine the training capacity for each center.
8. The organizing committee should verify the adequacy of exposure in the orthopedic subspecialties for each resident and, if necessary, arrange certain rotations in other local training centers.
9. The half-day educational activity should primarily be based on the residents educational needs with clear learning objectives, and the assigned tutors should be fully prepared and should notify the residents of possible absences ahead of time.
10. The examination system should be revised, and sudden changes of exam dates, locations and methods should be avoided. The candidates should be adequately prepared using simulated exams.

Conflict of interest

All researchers declare that no financial or other ties of the investigators or a member of his family to any party directly or indirectly involved in the field of study.

Appendix A. Supplementary data

Supplementary data related to this article can be found at http://dx.doi.org/10.1016/j.jtumed.2014.06.003.

References

1. CanMEDS: better standards, better physicians, better care [website]. (http://www.royalcollege.ca/portal/page/portal/rc/canmeds, accessed 01.01.14).
2. MOC Competencies and Criteria [website] (http://www.abms.org/Maintenance_of_Certification/MOC_competencies.aspx, accessed 01.01.14).
3. Egol KA, et al. Orthopaedic residency education: a practical guide to selection, training, and education. **AAOS Instr Course Lect 2013**; 62: 553–564.

4. Marker DR, et al. Orthopaedic journal publications and their role in the preparation for the orthopaedic in-training examination. **J Bone Jt Surg Am 2009**; 91(Suppl. 6): 59–66.
5. Australian Curriculum Framework for Junior Doctors (ACF) [website]. (http://www.cpmec.org.au/Page/australian-curriculum-framework-for-junior-doctors-acf-menu, accessed 01.01.14).
6. Berkenbosch L, et al. Medical residents' perceptions of their competencies and training needs in health care management: an international comparison. **BMC Med Educ 2013**; 13: 25.
7. Evaniew N, et al. The orthopaedic in-training examination: perspectives of program directors and residents from the United States and Canada. **J Surg Educ 2013**; 40: 528–536.
8. Miyamoto Jr RG, et al. Orthopedic surgery residents' study habits and performance on the orthopedic in-training examination. **Am J Orthop 2007**; 36(12): E185–E188.
9. LaPorte DM, et al. Educational resources for the orthopedic in-training examination. **J Surg Educ 2010**; 67(3): 135–138.
10. Costa ML, van Rensburg L, Rushton N. Does teaching style matter? A randomised trial of group discussion versus lectures in orthopaedic undergraduate teaching. **Med Educ 2007**; 41(2): 214–217.
11. Wadey VM, Dev P, Buckley R, Walker D, Hedden D. Competencies for a Canadian orthopaedic surgery core curriculum. **J Bone Jt Surg Br 2009**; 91(12): 1618–1622.
12. Gross RH, Greene J, Haynes R, Schafer MF. AOA symposium. Orthopaedic residency training: are we meeting expectations? **J Bone Jt Surg Am 2008**; 90(2): 429–437.
13. Bernstein J. Orthopaedic residency: how do you know when the "Cake is Done?". **Clin Orthop Relat Res 2013**; 471(1): 9–12.
14. Zukerman JD, Holder JP, Mercuri JJ, Phillips DP, Egol KA. Teaching professionalism in orthopaedic surgery residency programs. **J Bone Jt Surg Am 2012**; 94(8): e51.
15. Beran MC, Awan H, Rowley D, Samora JB, Griesser MJ, Bishop JY. Assessment of musculoskeletal physical examination skills and attitudes of orthopaedic residents. **J Bone Jt Surg Am 2012**; 94(6): e36.
16. Robbins, et al. Proposals for change in orthopaedic education: recommendations from an orthopaedic residency directors' peer forum. **J Bone Jt Surg Am 2010**; 92: 245–249.
17. Salazar D, Schiff A, Mitchell E, Hopkinson W. Variability in Accreditation Council for Graduate Medical Education Resident Case Log System practices among orthopaedic surgery residents. **J Bone Jt Surg Am 2014**; 96(3): e22.